

Can transdermal nicotine patch cause acute intoxication in a child? A case report and review of literature.

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Accepted 10 March 2004

Nicotine poisoning has been observed in children from ingestion of cigarettes, chewing gums & tobacco.^{1,2} Application of several patches to skin can cause serious over dosage resulting in serious toxicity due to first pass metabolism. A case is reported of nicotine overdose from patch application. A brief review of presentation and management of this condition is presented.³

INTRODUCTION

Transdermal nicotine patches (TNPs) are in use as an efficient method of drug delivery, helping adults to avoid cigarette smoking. We report an interesting case, where a child out of curiosity used these resulting in intoxication.

CASE REPORT

An 11 year old boy brought to our accident & emergency department by emergency ambulance. He described feeling nauseated, weak and unwell during play. He walked home, vomited twice complained of palpitation and fell to the floor from a settee feeling weak. He remained fully responsive. On arrival at A & E he was alert but anxious and complained of head and stomach ache and weakness. On examination he was unable to stand and his skin was cold and clammy. Breathing, circulation and level of consciousness were all normal, in particular he had a regular full volume pulse 90beats/min, BP 115/80. No neurological deficiency was noted. Random blood sugar and ECG were normal. The nicotine patch was found applied on left upper outer arm during the application of ECG electrode. A patch mark was evident below the in situ patch. They actually belonged to mother under treatment for smoking cessation. The first was applied the previous night and the second midday at the day of presentation. A diagnosis of nicotine poisoning was made. Patches were immediately removed and the skin washed with water. Patient monitored in A & E Department for four hours. During stay BP dropped to 90/60, pulse 70beats/min. A fluid

bolus was initially administered and repeated. No improvement was noticed. Injection Atropine Sulphate (.02mg/kg body weight) was administered intramuscularly. His condition improved gradually and he was asymptomatic after 4 hours. He was discharged home later.

DISCUSSION

Symptoms arising from inadvertent exposure to nicotine can be wide ranging in severity. These depend on dose, duration of exposure and route of administration.⁴

As transdermal route may cause serious toxicity due to first pass metabolism. TNPs are available for the treatment of smoking cessation without prescription. Therapeutic use has been associated with a variety of adverse effects including skin rashes, allergic skin reactions, nausea and vomiting, sleep disturbances, headache, chest pain. Symptoms following oral ingestion in children include gastrointestinal symptoms, increased salivation, pallor, weakness, and dizziness.⁵

In one series, as little as 0.2mg / kg of ingested nicotine caused mild toxic symptoms.² Complications such as lethargy, seizure, coma, respiratory depression, apnoea, hypertension, hypotension & dysrhythmia are seen in significant intoxication.⁶ In a study conducted by Woolf et al⁴ at 34 United States poison centres Patients were triaged to home observation or to the

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emergency department. For patient at home a telephone follow up for 24 hours was carried out. No child seen in emergency department had blood or urine sent for nicotine levels. Nicotine dose was calculated from the estimated time of exposure to TNP as reported by care worker. Higher dose TNPs releases 0.9 mg of nicotine per hour. Dose-response relationship was observed in TNPs releasing higher amount of nicotine. Children with an estimated dose of absorbed nicotine < 0.1mg/kg were unlikely to develop symptoms.

Recommended treatments include removal of patch, wash with water. If patch is ingested repeated doses of activated charcoal orally. In case of parasympathetic or sympathetic overstimulation use of atropine or phentolamine I/M or IV to be repeated as necessary.

CONCLUSION

As TNPs⁷ are available without prescription as aids for the treatment of smoking cessation, they are accessible to children. As data regarding toxic effect on paediatric TNPs exposure is lacking, these cases should be reported. Users need to be educated for safekeeping.

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